

AMENDMENTS TO THE CLAIMS

This listing of claims replaces all prior versions, and listings, of claims in the application.

Listing of claims:

Claims 1-6. (Canceled)

7. (Currently Amended) A method for monitoring the operating conditions of one or more spray nozzles of the type used in the cooling of flue gases and that is operative to receive pressurized liquid and pressurized air and to supply an atomized liquid spray comprising the steps of:

determining a required pressure ~~flow-rate~~ for various operating liquid flow rates being applied to the one or more spray nozzles;

monitoring an the actual liquid flow rate being applied to the one or more spray nozzles;

monitoring a measured pressure of the liquid provided to the one or more spray nozzles

determining a calculated liquid flow rate based on the measured pressure of the liquid;

comparing the actual liquid flow rate with the calculated liquid flow rate;

and

providing a signal indicative of a malfunction when a deviation between the actual liquid flow rate and the calculated liquid flow rate the detected liquid flow is greater than a maximum allowable percentage error.

8. (Currently Amended) A method The invention as in claim 7 further comprising the step of:

monitoring an the actual air flow rate being applied to the one or more spray nozzles;

monitoring a measured pressure of the pressurized air applied to the one or more spray nozzles;

determining a calculated air flow rate based on the measured pressure of pressurized air;

comparing the actual air flow rate with the calculated air flow rate; and
providing a signal indicative of a malfunction when a deviation of the actual air flow
rate from the calculated air flow rate with the detected air flow is greater than a maximum
allowable percentage error.

9. (Currently Amended) A control system for monitoring characteristics of one or more spray nozzles used in a flue gas cooling system wherein the one or more nozzles are of the type that operate to receive pressurized liquid and pressurized air and to provide an atomized liquid oriented at the flue gas to thereby cool the same, comprising:

a liquid supply line coupled with the one or more spray nozzles including a flow meter disposed therein for sensing a flow rate of liquid supplied to the one or more spray nozzles;

a compressed air supply line including an air regulation section disposed to provide an amount of compressed air supplied to the one or more spray nozzles; and

a spray controller coupled with the flow meter and the air regulation section, the controller being disposed to provide an output signal to indicate a performance characteristic of the spray nozzles based on the measured liquid pressure and/or measured air pressure;

an adjustable liquid flow valve located in the liquid spray supply line disposed to receive a control signal from the controller to adjust the amount of liquid supplied to the one or more spray nozzles; and

a temperature sensor located in proximate relation to the flue gas and disposed to provide a temperature sensing signal to the controller,

wherein the controller in response to receipt of the temperature sensing signal, adjusts control signal supplied to the liquid flow valve, the controller being further programmed to perform acts of monitoring an actual liquid flow rate and an actual air flow rate being applied to the one or more spray nozzles during operation, determining a calculated liquid flow rate based on a measured liquid pressure and determining a calculated air flow rate based on a measured air pressure; comparing the actual liquid flow rate with the calculated liquid flow rate and compare the actual air flow rate with the calculated air flow rate, and providing a signal indicative of a malfunction when either a deviation between the actual liquid flow rate and the calculated liquid flow rate is greater than a maximum allowable percentage error or a

deviation of the actual air flow rate from the calculated air flow rate is greater than a maximum allowable percentage error.

10. (Currently Amended) A control system as in claim 9, wherein for monitoring characteristics of one or more spray nozzles used in a flue gas cooling system wherein the one or more nozzles are of the type that operate to receive pressurized liquid and pressurized air and to provide an atomized liquid oriented at the flue gas to thereby cool the same, comprising:

a liquid supply line coupled with the one or more spray nozzles including a flow meter disposed therein for sensing a flow rate of liquid supplied to the one or more spray nozzles;

a compressed air supply line including an air regulation section disposed to provide an amount of compressed air supplied to the one or more spray nozzles; and

a spray controller coupled with the flow meter and the air regulation section, the controller is being disposed to provide an output signal to indicate a worn nozzle when the actual detected liquid flow rate exceeds the calculated liquid flow rate by a selected threshold for given pressure conditions.

11. (Currently Amended) A control system as in claim 9, wherein for monitoring characteristics of one or more spray nozzles used in a flue gas cooling system wherein the one or more nozzles are of the type that operate to receive pressurized liquid and pressurized air and to provide an atomized liquid oriented at the flue gas to thereby cool the same, comprising:

a liquid supply line coupled with the one or more spray nozzles including a flow meter disposed therein for sensing a flow rate of liquid supplied to the one or more spray nozzles;

a compressed air supply line including an air regulation section disposed to provide an amount of compressed air supplied to the one or more spray nozzles; and

a spray controller coupled with the flow meter and the air regulation section, the controller is being disposed to provide an output signal to indicate a blocked liquid nozzle orifice when the actual detected liquid flow rate is less than the calculated liquid flow rate by a selected threshold for given pressure conditions.

12. (Currently Amended) A control system as in claim 9, wherein for monitoring characteristics of one or more spray nozzles used in a flue gas cooling system wherein the one or more nozzles are of the type that operate to receive pressurized liquid and pressurized air and to provide an atomized liquid oriented at the flue gas to thereby cool the same, comprising:

~~a liquid supply line coupled with the one or more spray nozzles including a flow meter disposed therein for sensing a flow rate of liquid supplied to the one or more spray nozzles;~~

~~a compressed air supply line including an air regulation section disposed to provide an amount of compressed air supplied to the one or more spray nozzles; and~~

~~a spray controller coupled with the flow meter and the air regulation section, the controller is being disposed to provide an output signal to indicate a worn air orifice when the actual detected air flow rate is greater than the calculated air flow rate by a selected threshold for given pressure conditions.~~

13. (Currently Amended) A control system as in claim 9, wherein for monitoring characteristics of one or more spray nozzles used in a flue gas cooling system wherein the one or more nozzles are of the type that operate to receive pressurized liquid and pressurized air and to provide an atomized liquid oriented at the flue gas to thereby cool the same, comprising:

~~a liquid supply line coupled with the one or more spray nozzles including a flow meter disposed therein for sensing a flow rate of liquid supplied to the one or more spray nozzles;~~

~~a compressed air supply line including an air regulation section disposed to provide an amount of compressed air supplied to the one or more spray nozzles; and~~

~~a spray controller coupled with the flow meter and the air regulation section, the controller is being disposed to provide an output signal to indicate a blocked air nozzle orifice when the actual air flow rate detected liquid flow is less than the calculated air flow rate by a selected threshold for given pressure conditions.~~